

UNIONIDÆ OF GA., ALA., S. C., AND LA., IN SOUTH FLORIDA.

BY S. HART WRIGHT, PENN YAN, N. Y.

An interesting fact in geographical distribution is noted in the finding of Unionidae in Central and Southern Florida, which belong to, or were originally described as from the Central States of the South. In Volusia County, Fla., over one hundred miles south of Jacksonville and more than three hundred miles south of the middle portions of Ga. and Ala., several species of *Unio* have been found which were described from the latter States, or from S. C.

The St. Johns River flows northward past Volusia County, to Jacksonville and the Atlantic Ocean; and the introduction of Ga., Ala. and S. C. species against the current of the river for so great a distance is remarkable. Although the Unionidae have locomotion in a slight degree and might make headway against rivers and creeks, when once in them, they cannot thus get into waters which do not connect. Their introduction into remote regions may be through the agency of water-birds, which might carry juveniles long distances, and then drop them into new stations.

We found in Volusia Co., Fla., in 1887, the following species supposed to be transplanted from Georgia: *Unio Dariensis* Lea, *U. cicur* Lea and *Anodonta Couperiana* Lea, perhaps the most beautiful *Anodonta* in America, and the only one found in Florida of which we have any knowledge. We also found there, *U. modioli-formis* Lea and *U. angustatus* Lea, both from South Carolina. Mr. Charles T. Simpson found in Manatee County, one hundred and fifty miles farther south and on the west side of the state, *U. obesus* Lea and *U. granulatus* Lea, from Ga. and Alabama. Mr. George W. Webster sent us a few weeks ago, a species he found in Lake Co., west of Volusia Co., which proved to be *U. hepaticus* Lea, from Ga. and S. C. *U. opacus* Lea, from Ga. and *U. nigerrimus* Lea, from La. have been reported from middle Florida. None of the species indigenous to Southern Florida, so far as we can learn, have ever been found in any of the other Southern States.

NOTES ON THE CLASSIFICATION OF AMERICAN LAND SNAILS.

BY H. A. PILSBRY.

Since the publication of my Check-list of American Land Shells, many new forms (species, varieties and absolute synonyms) have

been described, and various obscure questions in phylogeny and classification have become more clear to me. It is my purpose to discuss these matters in a series of short papers.

Fischer has divided the suborder Geophila (=Stylommatophora) or stalked-eyed Pulmonates into two main branches, *Monotremata* and *Ditremata*. It seems to me that a more fundamental separation is indicated by the presence or absence of a jaw, together with the modifications accompanying this character. I would therefore primarily divide the land pulmonates into *Agnatha* and *Gnathophora*.

SUPERFAMILY AGNATHA.

No jaw; teeth of the radula arranged in very oblique V-shaped rows, all of them of the aculeate or thorn-shaped form, the side-teeth larger than the central tooth, which is often obsolete.

The families of *Agnatha* are as follows.¹

I. Mantle small, posterior; shell rudimentary or developed; a common genital orifice *Testacellidæ*.

II. Mantle enveloping the whole upper surface; no shell; genital orifices separated *Rathouisiidæ*.

The last named family is identical with the genus *Vaginulus* as understood by Stoliczka and Binney; not *Vaginulus* Fér., which as Férussac himself says has a jaw. *Veronicella* Blainv. and authors, is the same as *Vaginulus* Fér.

The *Rathouisiidæ* have been found only in India and China.

The *Testacellidæ* comprise a great variety of forms. The family is practically world-wide in distribution in tropical and subtropical regions.

Genus GLANDINA Schum.

Additional species and varieties.

G. truncata Gm., form *ovata* Dall. A short form, measuring 44 x 25 mm. Pliocene of the Caloosahatchie.

How does it differ from *bullata* Gould?

G. truncata Gm., form *macer* Dall. Long, narrow, but not parallel-sided, 75 x 20 mm. Recent, and fossil in the Caloosahatchie beds.

Like the form *parallela* W. G. B., these are doubtless only the extreme aspects of variation in a very mutable species.

¹ Fischer recognizes but one family, *Testacellidæ*; ignoring the agnathous *Vaginulus* like forms.

SUPERFAMILY GNATHOPIORA.

Jaw present.

I. Orifices of genitalia contiguous or united *Monotremata*.

II. Orifices of genitalia widely separated; no shell; mantle covering the whole upper surface *Ditremata*.

The *Monotremata* divide naturally into two divisions:

1. Lateral teeth of the aculeate or thorn-shaped type *Vitrinea*.

2. Lateral teeth of the quadrate type *Helicea*

1. Families of *Vitrinea*.

a. All of the teeth aculeate *Selenitidæ*.

b. Central and lateral teeth quadrate, uncini aculeate *Limacidæ*
Selenitidæ.

This family is not very distinct from *Limacidæ*, but the radula is more highly specialized. Of the genus *Selenites* numerous varieties and forms have been described since the publication of my check-list. They will be enumerated later.

Limacidæ.

All attempts to split this group into two or more families have proved impracticable. The various genera exhibit every stage in the degeneration of the shell. The presence or absence of a caudal mucus gland is equally unreliable, for genera otherwise closely allied, vary in this character.

The additions to our *Limax* list being unimportant will be deferred.

Additional species of *Zonites*.

Z. Shimekii Pilsbry. Loess formation of Iowa and Nebraska.

Z. Simpsoni Pilsbry. Indian Territory.

A NEW SPECIES OF ARCONAIA.

BY H. A. PILSBRRY.

Unio (*Arconaia*) *Provancheriana* sp. nov.

Shell wide, oblong, beaks at the anterior third. The whole shell twisted, very strongly resembling *Arca* (*Parallelopipedum*) *tortuosa* L., in the direction and degree of the twist. Hinge-line sigmoid. Anterior and posterior margins rounded; basal margin gently